

WHAT IS CLAIMED IS:

1. A color-adjusting apparatus comprising:
 - a total color-adjusting stage operable to perform a total color adjustment for data of an inputted color with respect to a total color to output data of a result vector of the total color adjustment;
 - a specific color-adjusting stage operable to perform a specific color adjustment for the data of the inputted color with respect to a specific color to output data of a result vector of the specific color adjustment; and
 - a composing unit operable to linearly compose the data of the result vector of the total color adjustment output by said total color-adjusting stage and the data of the result vector of the specific color adjustment output by said specific color-adjusting stage;
wherein said total color-adjusting stage and said specific color-adjusting stage are provided to operate in a parallel manner;
 - wherein, when a degree that said total color-adjusting stage adjusts the data of the inputted color increases, then a degree that said specific color-adjusting stage adjusts the data of the inputted color decreases; and
wherein, when a degree that said total color-adjusting stage adjusts the data of the inputted color decreases, then a degree that said specific color-adjusting stage adjusts the data of the inputted color increases.
2. A color-adjusting apparatus as defined in claim 1, wherein said total color-adjusting stage comprises:
 - a total color-weighting coefficient-calculating unit operable to calculate a total color-weighting coefficient indicating an approximation degree of the inputted color and the total color;
 - a total color-adjusting vector-outputting unit operable to output data of a total color-adjusting vector with respect to the total color; and

a total color-multiplying unit operable to multiply the total color-adjusting vector by the total color-weighting coefficient to output the data of the result vector of the total color adjustment;

wherein said specific color-adjusting stage comprises:

a specific color-weighting coefficient-calculating unit operable to calculate a specific color-weighting coefficient indicating an approximation degree of the inputted color and the specific color;

a specific color-adjusting vector-outputting unit operable to output data of a specific color-adjusting vector with respect to the specific color; and

a specific color-multiplying unit operable to multiply the specific color-adjusting vector by the specific color-weighting coefficient to output the data of the result vector of the specific color adjustment;

wherein, when the total color-weighting coefficient increases, then the specific color-weighting coefficient decreases;

wherein, when the total color-weighting coefficient decreases, then the specific color-weighting coefficient increases; and

wherein said composing unit is operable to add the inputted color, the result vector of the total color adjustment, and the result vector of the specific color adjustment to output data of an adjusted color.

3. A color-adjusting apparatus as defined in claim 2, wherein, when the inputted color equals the specific color, the specific color-weighting coefficient equals a maximum value;

wherein, when a distance in color space between the inputted color and the specific color increases, the specific color-weighting coefficient decreases; and

wherein, when the inputted color is not equivalent to the specific color, the total color-weighting coefficient is equivalent to the maximum value minus the specific color-weighting coefficient.

4. A color-adjusting apparatus as defined in claim 2, wherein the specific color-weighting coefficient is determined based on a weighting coefficient k_v evaluated on a brightness axis, a weighting coefficient k_c evaluated on a chroma axis, and a weighting coefficient k_h evaluated on a hue axis.

5. A color-adjusting apparatus as defined in claim 2, wherein the data of the specific color-adjusting vector is determined based on the data of the inputted color.

6. A color-adjusting apparatus as defined in claim 2, wherein the data of the total color-adjusting vector is determined based on the data of the inputted color.

7. A color-adjusting apparatus as defined in claim 2, wherein the specific color is selected from a group consisting of a plurality of colors; and

wherein the color-adjusting apparatus further comprises a selecting unit operable to automatically select a color from a group of colors as the specific color.

8. A color-adjusting apparatus as defined in claim 2, further comprising:
a color area-judging unit operable to store individual area information of a color space divided into a plurality of areas;

wherein said color area-judging unit is operable to determine an area to which the inputted color belongs, the area being one of the plurality of areas, and outputs area information corresponding to the inputted color;

wherein said specific color-weighting coefficient-calculating unit is operable to calculate, using the area information corresponding to the inputted color, the specific color-weighting coefficients indicating the approximation degree of the inputted color and the specific color; and

wherein said specific color-adjusting vector-outputting unit is operable to output, using the area information corresponding to the inputted color, the data of the specific color-adjusting vector with respect to the specific color.

9. A color-adjusting apparatus as defined in claim 8, wherein said specific color-adjusting stage further comprises:

a specific color-weighting coefficient-selecting unit operable to store a plurality of specific color-weighting coefficients, and operable to outputs a specific color-weighting coefficient among the plurality of specific color-weighting coefficients corresponding to the area information; and

a specific color-adjusting vector coefficient-selecting unit operable to store a plurality of specific color-adjusting vector coefficients, and operable to output a specific color-adjusting vector coefficient among the plurality of specific color-adjustment vector coefficients corresponding to the area information;

wherein said specific color-weighting coefficient-calculating unit is operable to calculate, using the specific color-weighting coefficient corresponding to the area information, the specific color-weighting coefficients indicating the approximation degree of the inputted color and the specific color; and

wherein said specific color-adjusting vector-outputting unit is operable to output, using the specific color-adjusting vector coefficient corresponding to the area information, the data of the specific color-adjusting vector with respect to the specific color.

10. A color-adjusting apparatus as defined in claim 8, wherein said specific color-weighting coefficient-calculating unit is operable to use the area information as an offset of a domain that defines one of the plurality of areas to which the inputted color belongs.

11. A color-adjusting apparatus as defined in claim 2, further comprising:

a color space-converting unit operable to map the data of the inputted color in an original color space into data of the inputted color in another color space defined by a brightness coordinate, a chroma coordinate, and a hue coordinate, and further operable to output data of the inputted color mapped to the other color space to said specific color-weighting coefficient-calculating unit.

12. A color-adjusting apparatus as defined in claim 2, further comprising:

a color space-inverse converting unit operable to map the data of the adjusted color in a color space defined by a brightness coordinate, a chroma coordinate, and a hue coordinate into data of the adjusted color in an original color space of the inputted color.

13. A color-adjusting apparatus as defined in claim 11, wherein the color space defined by the brightness coordinate, the chroma coordinate, and the hue coordinate is an HSV color space.

14. A color-adjusting apparatus for adjusting data of an inputted color with respect to a total color and a plurality of specific colors, said color-adjusting apparatus comprising:

a total color-adjusting stage operable to perform a total color adjustment for the inputted color with respect to a total color to output data of a result vector of the total color adjustment;

a specific color-adjusting stage operable to perform a specific color adjustment for the inputted color with respect to the plurality of specific colors to output data of a plurality of result vectors of the specific color adjustment; and

a composing unit operable to linearly compose the data of the result vector of the total color adjustment output by said total color-adjusting stage, and the data of the plurality of result vectors of the specific color adjustment output by said specific color-adjusting stage;

wherein said total color-adjusting stage and said specific color-adjusting stage are provided to operate in a parallel manner; and

wherein, when a degree that said total color-adjusting stage adjusts the data of the inputted color increases, then a degree that said specific color-adjusting stage adjusts the data of the inputted color decreases; and

wherein, when a degree that said total color-adjusting stage adjusts the data of the inputted color decreases, then a degree that said specific color-adjusting stage

adjusts the data of the inputted color increases.

15. A color-adjusting apparatus as defined in claim 14, wherein said total color-adjusting stage comprises:

a total color-weighting coefficient-calculating unit operable to calculate a total color-weighting coefficient indicating an approximation degree of the inputted color and the total color;

a total color-adjusting vector-outputting unit operable to output data of a total color-adjusting vector with respect to the total color; and

a total color-multiplying unit operable to multiply the total color-adjusting vector by the total color-weighting coefficient to output data of the result vector of the total color adjustment;

wherein said specific color-adjusting stage comprises a plurality of sub-stages;

wherein each of said plurality of sub-stages corresponds to each of the plurality of specific colors; and

wherein each of said plurality of sub-stages comprises:

a specific color-weighting coefficient-calculating unit operable to calculate a specific color-weighting coefficient with respect to one of the plurality of specific colors, the specific color-weighting coefficient indicating an approximation degree of the inputted color and one of the plurality of specific colors;

a specific color-adjusting vector-outputting unit operable to output data of a specific color-adjusting vector with respect to the one of the plurality of specific colors; and

a specific color-multiplying unit operable to multiply the specific color-adjusting vector with respect to the one of the plurality of specific colors by the specific color-weighting coefficient calculated by said specific color-weighting coefficient-calculating unit, and to output data of a result vector of the specific color adjustment with respect to the one of the plurality of specific colors;

wherein, when the specific color-weighting coefficient with respect to each of the plurality of specific colors increases, then the total color-weighting coefficient decreases;

wherein, when the specific color-weighting coefficient with respect to each of the plurality of specific colors decreases, then the total color-weighting coefficient increases;

wherein the plurality of result vectors of the specific color adjustment are composed of the sum of result vectors of the specific color adjustment with respect to the plurality of specific colors, each data of the result vectors of the specific color adjustment being outputted from a corresponding one of said plurality of sub-stages as data of the result vector of the specific color adjustment with respect to each of the plurality of specific colors; and

wherein said composing unit is operable to add the inputted color, the result vector of the total color adjustment, and the plurality of result vectors of the specific color adjustment to output data of an adjusted color.

16. A color-adjusting apparatus as defined in claim 15, wherein, when the inputted color is equivalent to one of the plurality of specific colors, a specific color-weighting coefficient with respect to the corresponding specific color is equivalent to a maximum value, and when a distance between the inputted color and each of the plurality of specific colors increases, the specific color-weighting coefficient with respect to each of the plurality of specific colors decreases; and

wherein, when the inputted color is not equivalent to each of the plurality of specific colors, the total color-weighting coefficient is equivalent to the maximum value minus the sum of a plurality of specific color-weighting coefficients, each of the plurality of specific color-weighting coefficients being calculated as the specific color-weighting coefficient with respect to each of the plurality of specific colors by said specific color-weighting coefficient-calculating unit being comprised by one of said

plurality of sub-stages.

17. A color-adjusting method for adjusting an inputted color with respect to a total color and a specific color, said color-adjusting method comprising:

performing a total color adjustment for an inputted color with respect to a total color to output a result vector of the total color adjustment;

performing a specific color adjustment for the inputted color with respect to the specific color to output a result vector of the specific color adjustment; and

linearly composing the result vector of the total color adjustment output by said performing the total color adjustment and the result vector of the specific color adjustment output by said performing the specific color adjustment;

wherein said performing the total color adjustment for the inputted color with respect to the total color and said performing the specific color adjustment for the inputted color with respect to the specific color are performed in parallel;

wherein, when a degree that said performing the total color adjustment for the inputted color with respect to the total color increases, then a degree that said performing the specific color adjustment for the inputted color with respect to the specific color decreases; and

wherein, when a degree that said performing the total color adjustment for the inputted color with respect to the total color adjusts the inputted color decreases, then a degree that said performing the specific color adjustment for the inputted color with respect to the specific color adjusts the inputted color increases.

18. A color-adjusting method as defined in claim 17, wherein said performing the total color adjustment for the inputted color with respect to the total color further comprises:

calculating a total color-weighting coefficient indicating an approximation degree of the inputted color and the total color;

outputting a total color-adjusting vector with respect to the total color; and

multiplied by the total color-adjusting vector by the total color-weighting coefficient to output the result vector of the total color adjustment;

wherein said performing the specific color adjustment for the inputted color with respect to the specific color further comprises:

calculating a specific color-weighting coefficient indicating an approximation degree of the inputted color and the specific color;

outputting a specific color-adjusting vector with respect to the specific color; and

multiplied by the specific color-adjusting vector by the specific color-weighting coefficient to output the result vector of the specific color adjustment;

wherein, when the total color-weighting coefficient increases, then the specific color-weighting coefficient decreases;

wherein, when the total color-weighting coefficient decreases, then the specific color-weighting coefficient increases;

wherein said linearly composing the result vector of the total color adjustment and the result vector of the specific color adjustment, further comprises:

adding the inputted color, the result vector of the total color adjustment, and the result vector of the specific color adjustment to output an adjusted color.

19. A color-adjusting method as defined in claim 18, wherein, when the inputted color is equivalent to the specific color, the specific color-weighting coefficient is equivalent to a maximum value;

wherein, when a distance in color space between the inputted color and the specific color increases, the specific color-weighting coefficient decreases; and

wherein, when the inputted color is not equivalent to the specific color, the total color-weighting coefficient is equivalent to the maximum value minus the specific color-weighting coefficient.

20. A color-adjusting method as defined in claim 18, wherein the specific

color-weighting coefficient is determined based on a weighting coefficient kv evaluated on a brightness axis, a weighting coefficient kc evaluated on a chroma axis, and a weighting coefficient kh evaluated on a hue axis.

21. A color-adjusting method as defined in claim 18, wherein the specific color is selected from a group consisting of a plurality of colors; and

wherein the color-adjusting method further comprises automatically selecting a color from a group as the specific color.

22. A color-adjusting method as defined in claim 18, further comprising:
storing individual area information of a color space divided into a plurality of areas;

determining an area to which the inputted color belongs, the area being one of the plurality of areas; and

outputting area information corresponding to the inputted color;

wherein each of said calculating the specific color-weighting coefficient and said outputting the specific color-adjusting vector with respect to the specific color, uses the area information corresponding to the inputted color.

23. A color-adjusting method as defined in claim 22, wherein said performing the specific color adjustment for the inputted color with respect to the specific color further comprises:

storing a plurality of specific color-weighting coefficients;

outputting a specific color-weighting coefficient among the plurality of specific color-weighting coefficients with respect to the area information corresponding to the inputted color;

storing a plurality of specific color-adjusting vector coefficients; and

outputting a specific color-adjusting vector coefficient among the plurality of specific color-adjusting vector coefficients with respect to the area information corresponding to the inputted color;

wherein said calculating the specific color-weighting coefficient uses the specific color-weighting coefficient among the plurality of specific color-weighting coefficients with respect to the area information corresponding to the inputted color; and

wherein said outputting the specific color-adjusting vector with respect to the specific color outputs the specific color-adjusting vector coefficient among the plurality of specific color-adjusting vector coefficients with respect to the area information corresponding to the inputted color.

24. A color-adjusting method as defined in claim 22, wherein said calculating the specific color-weighting coefficient uses the area information as an offset of a domain that defines one of the plurality of areas to which the inputted color belongs.

25. A color-adjusting method as defined in claim 18, further comprising:

mapping the inputted color in an original color space into the inputted color in another color space defined by a brightness coordinate, a chroma coordinate, and a hue coordinate; and

outputting the inputted color mapped to the other color space.

26. A color-adjusting method as defined in claim 18, further comprising:

mapping the adjusted color in a color space that is defined by a brightness coordinate, a chroma coordinate, and a hue coordinate, into the adjusted color in an original color space of the inputted color.

27. A color-adjusting method for adjusting an inputted color with respect to a total color and a plurality of specific colors, the color-adjusting method comprising:

performing a total color adjustment for the inputted color with respect to the total color to output a result vector of the total color adjustment;

performing a specific color adjustment for the inputted color with respect to the plurality of specific colors to output a plurality of result vectors of the specific color adjustment; and

linearly composing the result vector of the total color adjustment output by said

performing the total color adjustment and the plurality of result vectors of the specific color adjustments output by said specific color adjustment;

wherein said performing the total color adjustment for the inputted color with respect to the total color and said performing the specific color adjustment for the inputted color with respect to the plurality of specific colors are performed in parallel; and

wherein, when a degree that said performing the total color adjustment for the inputted color with respect to the total color increases, then a degree that said performing the specific color adjustment for the inputted color with respect to the plurality of specific colors decreases; and

wherein, when a degree that said performing the total color adjustment for the inputted color with respect to the total color adjusts the inputted color decreases, then a degree that said performing the specific color adjustment for the inputted color with respect to the plurality of specific colors increases.